

YOR9-2001-0335  
Amendment dated 06/23/2003

09/917,818

00280706aa  
Reply to office action mailed 04/22/2003

The following is a complete listing of all claims in the application, with an indication of the status of each:

**Listing of claims:**

1           1. (original) A method for identifying a cost-minimizing bid set for reverse  
2           combinatorial auctions where all-or-nothing bids are allowed, said method  
3           comprising:  
4                 introducing a decision variable for each bid;  
5                 introducing a counting variable to indicate whether bids from a  
6           supplier are chosen in an optimal bid set;  
7                 modeling demand constraints for each item using the bid variables;  
8                 modeling minimum and maximum numbers of suppliers based on the  
9           counting variables;  
10                introducing dummy variables to ensure existence of feasible solutions;  
11                for a given cost, formulating an objective of choosing bids that arrive  
12           early based on an additional timestamped objective with the given cost level  
13           as a constraint; and  
14                introducing price modifications to handle the formulated objective of  
15           choosing bids that arrive early.

1           2. (original) The method of claim 1, wherein the auction is a single-round  
2           auction.

1           3. (original) The method of claim 1, wherein the auction is a multiple-round  
2           auction.

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1       4. (original) A method for implementing a reverse combinatorial auction in  
2       which items of varying quantities are purchased, comprising:  
3               (a)     defining one or more parameters for the auction;  
4               (b)     accepting bids for a plurality of items in the auction;  
5               (c)     creating a set-covering formulation from said bids;  
6               (d)     adding predetermined business rules as a constraint to the set-  
7       covering formulation;  
8               (e)     automatically generating a computer-implemented  
9       representation of the set-covering formulation as constrained by said business  
10      rules; and  
11              (f)     determining a cost-minimizing bid set based on an  
12      implementation of the computer-implemented representation.

1       5. (original) The method of claim 4, wherein said parameters include  
2       information identifying the auction as at least one of the following: a single-  
3       round or multiple-round auction; an open-cry or sealed-bid auction; an auction  
4       with or without reservation; and potential suppliers.

1       6. (original) The method of claim 4, wherein step (e) includes:  
2               creating a constraint matrix corresponding to the set-covering  
3       formulation;  
4               determining a size of and a number of non-zero entries in the  
5       constraint matrix based on said one or more parameters;  
6               modifying the size of the constraint matrix to account for dummy bids  
7       added to the set-covering formulation;  
8               creating an array for said constraint matrix; and  
9               populating the array based on the set-covering formulation.

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1       7. (original) The method of claim 6, wherein said step of determining non-  
2       zero entries in said constraint matrix includes:  
3               defining respective indexes for said suppliers and a number of bids for  
4       each of said suppliers;  
5               generating an item vector for each of said bids;  
6               determining a number of items in each item vector;  
7               adding the number of items in each item vector to a count of non-zero  
8       entries for each bid of each of said suppliers;  
9               for each of said suppliers, increasing the count by a predetermined  
10       number to account for counting variables; and  
11       updating the count to add non-zeros for the dummy variables.

1       8. (original) The method of claim 6, wherein said step of creating a  
2       constraint matrix includes:  
3               initializing a supplier index, a non-zero count variable, and a column  
4       count variable;  
5               acquiring information corresponding to a first supplier bid;  
6               acquiring an item vector for the first supplier bid;  
7               updating an initial objective value for a decision variable;  
8               for each non-zero item in an item vector, introducing a non-zero entry  
9       in the constraint matrix;  
10       for each bid, add two non-zero entries for a min/max quantity  
11       constraint; and  
12       adding the non-zero entries for the counting variables.

1       9. (original) The method of claim 8, wherein said step of adding non-zero  
2       entries includes:

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3           introducing a non-zero entry for a minimum quantity constraint and a  
4           maximum quantity constraint;  
5           adding a non-zero entry for a minimum number of suppliers constraint;  
6           and  
7           adding non-zeros associated with a dummy variable.

1           10. (original) The method of claim 4, further comprising:  
2           populating arrays associated with constraints in accordance with steps  
3           that include:  
4           initializing an index for items and suppliers;  
5           defining lower and upper bounds for each of a plurality of demand  
6           constraints;  
7           defining the lower and upper bounds for a min/max quantity  
8           constraint; and  
9           defining lower and upper bounds for a minimum number and a  
10          maximum number of supplier constraints.

1           11. (previously amended) The method of claim 4, wherein step (f) is  
2           performed by a linear programming/integer programming (LP/IP) solver.